AN

INQUIRY INTO THE CLAIMS

THAT

SURGERY

MAY BE SUPPOSED TO HAVE FOR BEING CLASSED

AS

A SCIENCE.

BY

JOHN P. VINCENT,

LATE SENIOR SURGEON TO ST. BARTHOLOMEW'S HOSPITAL.

LONDON:

LONGMAN, BROWN, GREEN, AND LONGMANS,

PATERNOSTER-ROW.

1848.

AN INQUIRY

INTO

THE CLAIMS THAT SURGERY MAY BE SUPPOSED TO HAVE FOR BEING CLASSED AS A SCIENCE.

An investigation which has for its object the appropriate application of a term, must begin with a tolerably precise understanding of the subject on which the term is to be employed. In regard to the proposed inquiry, it must be admitted that there is no term more vaguely adopted, or more loosely applied, than the word Science. It is so inconsiderately brought into use, and placed in so obscure a point of view when adopted, in the ordinary language of the age, that it may be questioned, on many occasions where it occurs, whether it be designed to apply it to the exercise of the head or of the hands. Indeed, in some of the ways in which it is used, it seems to be applicable to the amount in which individuals are remunerated for

their exertions, whether these have reference to the mind or to the body. Again, in those employments to which the world assigns the highest character in the exercise of the means of procuring competency, that is, professions, there seems to be an implied understanding that the persons engaged in them have a scientific condition of mind. But this is by no means true, as it may be found in some cases, that even the artizan exhibits a more scientific development of mind than the professional man, who possesses a higher degree of respectability in the eye of the world.

But however confused the way may be in which the term is adopted, and however much the want of clearness in fixing the precise distinctions that exist between science and art, it would seem that it is upon the acknowledged superiority of a scientific character that professional men lay claim to the advantages of the high ground they occupy. In this way it is probably assumed that professional men are necessarily men of science. The surgeon is by no means backward in putting in claims of this kind. But as the grounds of his pretensions may be questionable, it may fulfil an useful purpose to inquire into the validity of them, inasmuch as if these grounds are not found capable of vindicating the claim, it will show that surgeons have a duty, incumbent on them, of setting about acquiring the means of improving the scientific character of their profession, and therefore of af-

fording increased benefit to the public, by infusing into their practice the powerful aids that real science must necessarily impart to it.

In centralising those glimmerings which are emitted from men's minds, when they speak of science, we discover that they evidently calculate upon some intellectual elaboration for educing its principles; and in this way allusion is made to the abstract sciences, as indicating some intellectual processes, independent of, or abstracted from matter, and not that intelligence of it, derived merely from the way it acts upon the senses. Surgeons, in making this kind of reference, often speak in a way, indicating that they felt that their branch of natural knowledge could never reach to the perfect state of real science; but that it might partake of some of its invaluable qualities, derived to it by a sort of collateral connection. Science is absolute, and its stream flows unalterably, retained in its secure banks, which admit no oozings of impure waters to sully its pellucid stream.

Whenever the question of science is discussed, there is always an allusion made to the mathematics, which is represented as a branch of intelligence pre-eminently scientific, but of an order so superior and distinct, that the understanding cannot be supposed to attain to an equal degree of scientific perfection in any branch of natural knowledge. The whole bearings of the question have not been sufficiently entered upon to

allow this conclusion. It is true that the intellect more readily conceives the relations which number and quantity present to it, than it does those of other objects; this being necessary in order that the mind may acquire necessary truths. It cannot be predicated that natural knowledge is excluded from being placed in the elevated condition of absolute science, until the most proper means have been instituted for establishing its scientific character. It is not at all unlikely that a rooted habit of looking to the acuteness of the senses for the sources of its principles, has left surgery so long unenlightened by the beams which intellectual truths can throw around it.

In the conflicting notions that men have of science, they seem to imply that it may be attained by some other means than by the mental faculties, as if there was any other way by which absolute truth can be arrived at. Science is the comprehension of truth in any of the departments of knowledge*, over which the mind has the power of giving certainty to the results of its investigations. On the other hand, we constantly hear the term applied to the knowledge of things derived from the senses, and not from the intellect, and therefore such knowledge is neither fixed nor certain, because it is not capable of being demonstrated.

Science is represented as the clear knowledge of

* Knowledge here signifies all information conveyed to the mind of whatsoever description.

subjects presented to the mind, founded upon self-evident principles, with consequential and clearly connected demonstrations, which collectively amount to a body of demonstrated truths. But this train of operations can be only carried on by the intellect, fully and brilliantly shown in mathematical inquiries, so fully acknowledged by all; although men, and particularly medical men, continually understand by science that comprehension of things which is obtained by means only of the senses, but such sources are not admissible in science. The most vague conception of what mathematical science is, must show that all the intelligence* of things which the mere senses can convey will never form a system of demonstrated truths. The most perspicacious representation, derived from the senses, can never implant in the mind a single intellectual truth, which is to become the starting point of science. The anatomist prosecutes with zeal and ability the knowledge of the forms of the animal structure, and by such labours various observers have given different accounts of the muscular fibre, just as new and improved microscopes have come into use. The fact is, that this sort of discovery amounts to nothing, until the mind can elicit all the relations existing between objects, and then it really becomes a scientific enunciation.

* Intelligence is meant to imply the degree of the understanding the mind has of any thing, however imperfect.

The existence of bodies, being a thing of no reasonable doubt, nor to be seriously questioned by any sober understanding, yet as to their nature they admit of no strict and rigorous demonstration upon the principle of sensation. No truth can be demonstrated but what has a dependence upon its principles, otherwise that by which the proof is to be made will want proof itself, and therefore is no demonstration. But where is the necessary connection between a sensation within, and the existence of bodies without?* "Sensus enim fallunt utique. Testimonium et informatio sensus semper sunt ex analogia hominis non ex analogia universi; atque prorsus magno errore asseritur, sensum esse mensuram rerum; sensus enim per se res infima est et aberrans." †

Science being a series of demonstrations derivable from absolute truths, the senses cannot afford that sort of intelligence of things upon which the principles of science may be founded. "The senses may be adequate and sufficient for the end which nature designed, to give advertisement of corporeal things without us, yet sense is not intellection. Sense is fixed in the material form, and not able to ascend to an abstract universal notion." ‡ Sense is not science or intellection,

* An Essay on the Theory of the Ideal or Intelligible World, by J. Norris.

† Bacon.

‡ A Treatise concerning Eternal and Immutable Morality, by R. Cudworth, D. D.

because the soul by sense does not perceive the things themselves, or the absolute nature of them, but only her own passions from them. Sense itself is but the passive perception of some individual, material forms. The senses do not discover what bodies are in themselves, so much as what they are in relation to us. There is no necessary connection between a sensation within, and the existence of bodies without, by which it may be reasoned demonstratively from one to the other.*

In the House of Wisdom, the ideal fabric stands upon a more stable foundation than the frame of external nature; and as sure as the sensible world is, the intelligible world is yet surer.* The intellectual powers commence these operations by supplying and exercising eternal truths, which are the same as eternal habitudes or relations of things, such as are necessarily, immutably, and perpetually the same. These are the standing and indefectible objects of science. Without such truths there could be no such thing as science, because necessary and eternal truths are the grounds of demonstration. Thus we find that in arithmetic every body has implanted in his intellect a clear comprehension that four units, however varied, make the number four, and can by no possibility make any other. In the same way, the moment the mind discovers that a circle is produced by the revolution of its radius, the intellect understands that there is that relation between the radius and cir-

* Norris.

cumference, or the circle itself, that is necessary, invariable, and perpetual. The perfect knowledge of the circle is at once acquired by the intellect, on discovering the relations in its parts. In this way it is that "Science is the comprehension of that which necessarily is;"* and no intelligence we can have of things that has not this condition, can be admitted as science.

Thus science is properly represented as that clear and complete knowledge of subjects possessed by the mind, founded upon self-evident principles, and with consequential demonstrations, so that they amount to a body of demonstrated truths. And the result of what has been considered is to show that it must be on much more certain grounds, than the mere representation, which the exercise of the senses can convey, that science is to be founded. The senses, however assisted by the ingenuity and improvement of art, cannot be made to afford to the mind that perfect intelligence which is the necessary condition for the discovery of truth. The use of the microscope affords little for the improvement of science until it begins to lay open to the mind relations before unknown. In the investigation into the quality of science, we must look up to some higher condition of the mind than that which may be produced by the perception of external bodies. This is the light in which the expression, intellectual science, is expected to be viewed, more particularly

* Cudworth.

when applied to the mathematics. Whatever may be the impression which external objects make on the mind by simple perception, the only scientific intelligence that can be received of them must be derived from a procedure intimately connected with the mind itself. It is only in the laboratory of mental operations that absolute and necessary truths can be produced. It is on account of this fact not being clearly understood, that men, and more especially medical men, have been wrongly led to imagine that investigations carried on upon the mere principle of their perceptions of external objects, could educe those conditions that are required to form a science.

No one can be ignorant that however perfectly a straight line may be drawn on paper, when it is placed in the field of a microscope, it no longer appears to be a clean, even, line, as it did before; but it is now represented as not only having a degree of breadth before unnoticed, but that this breadth is of different thickness in different parts, and also that it no longer appears accurately straight. Such a line viewed by a geometrician excites no other idea in him than in others unacquainted with geometry, as long as it is seen alone. But if another line, equally awkward, be placed in juxtaposition, either parallel, obliquely to it, or across it, then the geometrician catches all the relations which these lines have with each other,

and by this he arrives at immutable truths. A glance at the possible relations is enough, his conviction is complete, his conclusions are sure, and he is engaged in a strictly scientific procedure. The intellect has made itself master of the relations which the two lines bear between each other, when it has nothing further to borrow from perceptions without itself; he rejects, as unfit for any further use, the clumsy lines that the hand could not better make; and adopts the delicate and accurate ones that are formed by a geometrician's intellect as the only ones suited for the purposes of true science. I need only allude to this difference in the powers of the intellect over that knowledge which is to be obtained by the mere perceptions, to establish the fact that the seat of science is entirely in the mind.

The mind is known as being a manifestation of the connection of the soul with the body. It is the depository and conservatory of all the intelligences that can be comprehended. It is a tablet upon which the characters of eternal truths can be impressed. And it has the reflex power of thinking upon and deciphering these characters, which are imparted to it. It derives from the soul the power of discovering necessary and eternal truths, and convinces us of our existence, and of the attributes of omniscience and eternity, manifested in the creation. The essential and autho-

ritative quality of the mind, as the most purely intellectual, must be referred to the soul as its source. Therefore, that which is really and fully apprehended and understood in the mind, arises from the thinking powers of the soul.*

"The human mind does not see the nature of things by pure intellection, for in that case all knowledge would be immediately and already understood by simple impressions on the mind; but by intellection. The comprehension of truth is an inward, active energy of the mind itself, and the displaying of its own vigour from within, whereby it doth conquer, master, and command objects; and so beget a clear, serene, victorious, and satisfactory sense within itself.† It is not allowed to created beings to see the essence of things; and the mind cannot comprehend any thing by direct intuition, this being the attribute of omniscience." "But the mind can reflect upon her own actions and upon her own sensations; and the mind need not go out of herself for the perception of any of them, because they are in herself."‡

Life implies action, and the action of the mind is thought, in the same way that the action of the body is motion.‡ Thought is an operation of the mind which we are conscious of when it is employed abstractedly from its object; and it is a process by which we become inwardly conscious

* Norris. † Cudworth. ‡ Norris.

of what is passing in our minds. It is by thought that the mind of man may ascend to the highest point of intellectuality; and without it, acting from the impulse of simple perceptions, men would be left at the lowest level of understanding. There is a difference of thinking from mere perception, and thinking by way of desire. We can will to think, and we can think in opposition to will. And the will can not only give the direction but the intensity of thought, when in its most individual and unaffected state. Action to produce results must have more than one thing to employ its force, and there must be some specialities upon which thought may act — these are ideas. This is a term which has been adapted to the intelligence the mind receives from the mere perception of external objects; but the ideas which are engaged in the reasoning quality of the mind, under the ministration of thought, are purely intellectual ideas.

Intellectual ideas are not created by the mind for occasional purposes, nor are they the creatures of the will, but they are inherent and indefectibly consistent with it. The mind by a reflex act not only can contemplate intellectual ideas, but the relations that exist between them.* The instance quoted of the perfect comprehension which the mind gets of the mathematical line of no breadth and perfect straightness, by merely placing two

* Norris.

lines any way across each other, is a proof of the extent of analysing power acquired by the intellectual perceptions of abstract and immutable ideas. "Intellectual ideas are essentially an integral part of the mind, imparted to it by the soul, that is, by the Author of all wisdom, and therefore men cannot instruct us by giving intellectual ideas of things, but only by making us attentive to those we have, and by exercising them to the greatest extent."* "All ideas, even those of external objects, must be intimately united to the mind, as being the only way they can be the objects of the mind." Besides the ideas of things which are intelligible to us, and of which we have a clear perception, there are others that are intelligible in themselves and not so to us, and of which we have no clear perception; this is exemplified in the case of the diagonal of a square being incommensurable with the side.†

Intellectual ideas regarded as the instruments employed by the powers of thought for discovering immutable or necessary truths, are recognised in the mental act by which we think. The mind feels difficulty in thinking upon some things, and requires exertion to produce attention; there is also labour in thinking; thus proving that thought must be an active principle. By the active powers of thinking, the intellectual perceptions dis-

* Malebranche's Recherche de la Vérité.

† Norris.

cover the relations and habitudes of intelligible ideas. In this way it is that all science must be abstract, in conformity with that acceptation of the term which is applied to the mathematics and to other strict sciences. And although the human mind is not gifted with the perception of seeing the absolute nature of things by simple intuition; yet by the agency of its endowed intellectual processes, it may be declared to be able to discover absolute and eternal truths, or the immutable nature of things.

"The very act of thinking may be the object of thought, by the reflex way of thinking, or by turning its view inwards." This distinguishes the character of a thinking man. All the world, in one way or in another, thinks; but there are only here and there some who reflect, and carefully and attentively observe what is doing in their own minds. Reflex thinking teaches us the knowledge of ourselves, a knowledge that few value, and from which most persons industriously fly. It is by reflection that we come to know the true state of human nature, and perhaps to discover its dignity and its excellency. "Thought is not held in the estimation it is entitled to, and few are either masters or judges of it, by its not answering the ends of those who court popularity, which is more easily acquired by having an insight into a great deal superficially, than by the intellectual accomplishment of intense thinking; which is

reckoned of less account, and therefore less followed." *

The object which has been kept in view in making these psychological observations, is to show that there may be very wide degrees of the powers in the human mind calculated for the investigation of truths. Of course the understanding, which is the intelligence or comprehension which the mind acquires of any subject with which it is occupied, must vary in proportion to the intellectuality of the individual mind, which is engaged in the inquiry. When the understanding is easily satisfied, owing either to the low order of the individual mind, and inability of it to mount higher than the simple perception of first impressions, it gives its own assent to the completeness of the intelligence it has received, and by such an easy process the judgment is formed. This sort of judgment is not only very often low in the scale of intellectuality, but may descend to a degree that excludes the very application of the name of judgment. Opinion is so much the guide of medical conduct, that it is sometimes actually regarded and valued as much as a sound judgment. "Opinion is nothing else but a vain, easy, crude, and imperfect judgment of things, taken upon slight and insufficient grounds; too credulous assent to our outward senses which rests upon the appearance of things, without referring the matter

* Norris

to be thoroughly examined and digested by the intellectual powers. Opinion is most commonly a false, fleeting, and uncertain thing."* Quæ in opinione fundata sunt, variantur, non augentur. † Real science has a much more noble foundation for its basis than crude, undigested opinions, however acute or perspicacious; it must be sought in the recesses of the intellectual powers.

It has been conceived, that strict science in natural knowledge is unattainable, because the subject has but little analogy with the intellectual ideas, which at once perceive the relations and habits, when simple number or quantity are submitted to mental dynamics; and that there is an inapplicability in their nature, to be applied to the objects of the material world. But the capacity of the intellect is such, that it can adjust the lines of truth in every quarter of the creation; for absolute wisdom has founded all nature in truth. In all the objects of natural knowledge there are sufficient numbers of salient points and prominent elevations to which the mental theodolite and quadrant may be applied in every survey, to which the mind may direct its attention. And in this way may be obtained those relations, which become fundamental points for establishing the foundation of science.

The machinery of the mind is more or less perfectly constructed; and individuals vary consider-

* Charron, de la Sagesse. † Bacon.

ably, as they possess, or as they bring into use, the more perfect or the more imperfect means for eliciting truths. There is a very considerable variation arising from the affection and aptitudes of different minds, in giving the direction and exciting the energies to one class of intellectual exercises rather than to others. As the compliance with this partiality is always accompanied by more earnestness than when the mental energies are otherwise employed, so the greatest powers of the mind are then most likely to be developed.

There is an inherent difference in the quality of the intellect, which produces a marked distinction in the capability and power which the mind possesses. The very acute and perspicuous Pascal* has described the minds of men to be readily divided into two classes; the one that of "l'esprit de finesse," the other "l'esprit de géométrie." The character of "l'esprit de finesse" indicates that when the mind is satisfied with the acuteness of its penetration, and the clearness and correctness of its perceptions, it has sufficient for convincing the understanding. And therefore this kind of mind forms its judgment upon such principles only; being unaccustomed to the laborious processes of the geometrical mind. "L'esprit fin, ou, de finesse," may be turned into English by the word perceptuous, as the conception of it has arisen

* Pascal, Pensées, &c.

from the supposed sufficiency of the perceptions to ground a judgment. But the English word more analogous to the French is, subtle mind.

But it has been shown that to be satisfied with the soundness of principles, they must be founded on some necessary and immutable truths. And it has been stated above that the mind can only apprehend the truth of things by means of those relations which the intellect has the power of discovering. It will thus be seen, that while the perceptuous character of mind clearly and correctly sees all that perception can convey to it, it is satisfied that it has ascended to the very limits of information that the understanding can have. But the geometrical character carries its powers of intellectual investigations to much higher regions than those to which the other can arrive. In the allusion made, in reference to this quality of mind, to geometry, it is not supposed that a high degree of mathematical acquirements should be possessed; it is only intended to show that the intellect, to be entitled to the appellation, should have the facility of noticing all the relations of things that are presented to observation, and the power of comparing them in the mind; so that by an abstract process the principles of science may be elicited.

It will be evident, from what has been said, that in prosecuting an inquiry, which has the character of science for its subject, the peculiarities

of these two descriptions of mind must form a most important portion of the investigation.

The perceptuous mind ("l'esprit de finesse") engages itself upon that which is obvious and clearly presented to its view; therefore its application is in constant use, and obvious to all. The will strongly inclines the mind to admit the opinions so formed as truths, obtained as they are without the labour of the analysing process of thinking. As the powers of the perceptuous mind cannot exercise itself in intelligences beyond that which it clearly perceives, it is impressed with a conviction it has reached the ultimate limits of human understanding, at a point where the higher order of the intellectual faculties may be supposed only to begin. The construction of the perceptuous mind does not include the processes by which the bounds of science may be enlarged. It is too limited in its power to enable it to penetrate to the principles of things. This cast of mind obtains in all those who do not think deeply, which is a class of great extent in numbers. In this way, many are admitted to be men of science, without having that character of the mind correctly entitling them to such a description. The quality of this cast of mind being that of having the ability of seeing clearly the objects of their perception, so it gives to those who possess it a ready way of knowing and adverting to the most appropriate diction, for expressing their opinions. In this way it is that so many people have the credit of

being of a scientific mind, who really have the slightest pretensions for such a character. A clear conception of what presents itself to the understanding, and a favourable memory for retaining this knowledge, are circumstances that generally establish the possessor to be scientific, although he may hardly have a spark of that intellectual light, which is absolutely necessary for those to possess who are to improve and enlarge science. It is a very different thing merely to know what others have done for enlarging the boundaries of science, to that of possessing the intellectual power, adapted for increasing its principles.

The essential quality of the intellectual character of the mind has been explained, in the allusion to the geometrical problems that arise, by simply placing two lines across each other. It is that quality of intellect which quickly understands the intelligible ideas of things in a way by which all the relations, in every possible condition in which those things can exist, are discoverable; the only way the real nature of things, and the fundamental truths of science can be obtained. It must be apparent that although the perceptuous character is best calculated for a clear conception and accurate description of all the facts subservient to science, and for placing them in the best point of view to be comprehended by others, yet it is limited in its capability to promote science. But it has

those qualities particularly well suited to produce compilations and dictionaries; labours which afford considerable and valuable assistance to those engaged in the prosecution of scientific acquirements. But we do not find, nor are we to expect it should be so, that new principles should be discovered, or that the field of real science should be enlarged by such a cast of mind. "Fortasse enim destituetur, nec habebit facultatem et commoditatem talia media comparandi et procurandi." *

It is only necessary to take a cursory view of the world to discover that, whilst men who have no real scientific intellects are allowed to enjoy the fullest advantages, which the just application of the title can confer, the most part of men, having no greater scope of intellect than these pretenders, readily concede to them the credit of such pretensions. When the gentle and willing empire of opinion † is founded, the toil of intellectual labour is never supposed to be necessary, or never properly conceived to be the real distinction of a scientific mind. "Error imperiosus et magistralis, ita demum compositus, ut potius fidem imperet, quam examini subjiciatur." ‡

It is an instance of the prevalence of this magisterial power of opinion, and of the prevailing notion of the sufficiency of the mere perceptuous knowledge of things, when placed in combination with memory, and keeping out of view the real ad-

* Bacon. † Pascal. ‡ Bacon.

vantage of the intellectual faculties of the mind, that those who have of late years put themselves forward as the best prescribers for medical education, have conceived that in huddling together all sorts of ingredients for the students to swallow, they formed the surest way of perfecting the qualification of those dedicated to the healing art. The folly of such propositions must be apparent, even upon the principle that they could not be carried out in a way to be perfect. But the remarkable folly is that they should be so ignorant of the real nature of science. Science is a system of demonstrations, and a demonstration must engage the mind in deliberations: deliberation is the employment of the intellect upon one or a series of inquiries into the relations of things. It must be, therefore, incompatible in a scientific mind to suppose that education can go on without periods of reflection. There must be resting stations for the repose of thought, that all the conditions and relations of each part of the subject, may be deliberately viewed, and brought into their proper positions and assigned relations.

So far from giving the profession the real character of science, by making no distinctions in its branches, such a step must inevitably destroy the little pretensions it has for being classed as such. The suggestion entirely avoids all the material advantage of forming the mind to exercise its powers, and of adopting a beneficial way of making use of what is really known. At

the present time the encouragement to induce young men to follow up their studies and improve themselves, has no precise bearing upon real scientific pursuits, as it incites them to mere accumulation; the ant, and not the bee, is made the symbol of their endeavours. "Empirici formicæ more congerunt tantum et utuntur. Apis vero materiam ex floribus horti et agri elicit, sed tamen eam propria facultate vertit et digerit."* We find, in the very inducements offered to young men to prosecute their studies with assiduity and precision, that the course laid down is only applicable to the quantity of the mere knowledge of things, and to the capacity of the memory to retain this knowledge. The deep and weighty matter of the development of that intellect which can make this knowledge available, wherever it can be brought into operation, is lost sight of; and science and improvement stand still.

If the processes by which the minds of young men, intended for the profession, are not fully developed in a scientific way, and the expansion of the intellect is not encouraged by those means proper to advance it, we cannot be surprised that surgery should not present itself with the illuminated features of a science. "Tempus, tanquam fluvius, levia et inflata ad nos devexerit, gravia et solida demerserit."* If it be argued that the imperfection in prosecuting scientific sur-

* Bacon.

them tone. That opinions have but a small value in a scientific point of view, is proved by their unstableness, and by the readiness with which they are changed. Thus the practice of surgery is apparently not only taught, but pursued, by prescription, and but little on principles of science.

The qualifications of the practitioner who may be placed within the pale of the preceding description, are such as Bacon entitled empirici; the knowledge required for such practice is heaped up, and cast, as it were, into the memory, and then any part is taken out separately, as it may be wanted, and for a limited purpose, without any regard to all the conditions under which it may exist in relation with other things. This cannot be called scientific practice. For the purposes of scientific practice the mind must be contemplative, and ponder on every step as it proceeds, in which way it institutes every means of making comparisons, of analysing the conditions, and of studying the relations in disease; and the scientific man, knowing the foundation by which he is supported, reposes in confidence on the security of the plans he adopts. The fact is, that it is not the possession of all that is known in all the branches of the surgeon's profession, that necessarily implies that he is a scientific man, or that he practises scientifically. It is the scientific quality of his mind that enables him to give the character of science to that which he knows, by making those correct

observations upon all the conditions and variations of things when presented to him, by which he can draw sure inferences, and adopt correct proceedings for the advantage of his patient. It is in the intellectual character of the mind, and not in the quantity of the knowledge he possesses, that we are to look for a scientific practitioner. So true is this, that the converse proposition may be taken as an axiom, viz. that the good practitioner has that intellectual quality of mind, which is characteristic of science; that he has the faculty of comparing and of associating all the relations he discovers, so that he obtains a combination of facts connected by scientific principles; and does not conduct his proceedings upon the opinions of others, or even of his own, presented as they usually are, without any deliberation to sanction their value.

It must have been observed by those who mix with medical men, that the benefit conferred upon patients is by no means commensurate with the course of education of the practitioner; for many men are known to have had very slender instruction, who are excellent practitioners. And, again, many who have had elaborate means of qualifying themselves, and who have thereby acquired a high character, have yet been below others either in the faculty of discovering, or in the management of disease. If surgery were really taught in the way of a science such discrepancies would not

occur, because as truth is the very essence of science, what was taught as a science would carry with it all the powers of its influence, and maintain the certainty of its results. It may be again repeated that surgery is both taught and practised by prescription. And although it may, without doubt, be made to assume all the characters and the improved value of a scientific profession, it hardly yet presents itself with claims to be called a science, in the just and legitimate acceptation of this word.

It is a fact admitted by all observers, that great and persisting processes of nature are carried on by an under current. It is not by looking on the swelling and impetuous wave, beating against breakers, but in observing what is going on in the gentle ripplings of the ebb tide, that the philosopher is best enabled to institute his inquiries, and to draw his safest conclusions. It is so in medical practice: whilst the practitioner, relying upon the efficiency of his remedies, is confidently expecting to prove their curative powers, he is obliged to acknowledge that disease unalterably advances to a destructive end. And, on the other hand, the attendant may sometimes find, that when he despairs of his means, the processes of nature, quietly working under a concealed influence, slowly perfect the unlooked-for cure. The medical man tasks his memory to the suggestion of some expedient to meet the various changes that occur in disease,

thinking to display the cleverness of his art in the application of it to every contingency; but this ends in a failure, and he proves that his profession is conjectural and defective, and not a science. In this way it is that many persons, particularly those who are well educated, set but little value upon the remedies that are prescribed for them. Ingenuousness in medical men, as in all, would do more to elevate the character, by candidly admitting the limits of their means, than any attempt to display surpassing ability. Science is of itself clear as light, and not "mera palpatio, quali homines in noctu utuntur, omnia pertentando si forte in rectam viam incidere detur." *

In studying the habitudes of the human mind, from its full development to the close of life, we may observe in most men that, as life advances, the mind gradually recedes from the trouble of getting the materials of its contemplation from without, and individuals turn inwardly to survey and enjoy those intellectual fruits which have been the product of their own especial cultivation. He who would preserve himself from the hebetude of age must in early life store his mind with truths which he himself has educed. Youth may have its own blandishments, but age has also its comforts in reviewing the unfailing truths it has acquired in the progress of life. These reflections apply especially to surgeons, in reference to the state of

* Bacon.

their professional acquirements, who ought to do more than just carry about with them all their lives the substance of other persons' surgery. The surgeon, by the helpful quality of his memory, and by his assiduity in obtaining information, may be possessed of all the information of his time; and he may suppose he has quite enough to form, not only the basis, but the superstructure of the practice with which he is to pursue his career. But if the surgeon does not construct a surgery of his own, as he goes on in life, he will find he has no useful resources, when referring to the opinions and views he has borrowed from others on whom he has been used to lean; and having omitted to fill a storehouse with the useful principles of his own establishing, he will retain but a slender share of usefulness in his position. Such have not, and therefore perhaps will not value, experience; which I have known to happen.

Surgeons are in the habit of making use of the term Mechanics; and of adopting proceedings, to which they give this name. But that art to which they usually apply the term, is totally different from that which is truly and mathematically mechanics; so that an instructed observer might well ridicule, on some occasions, the use of the term. Mechanics, properly understood, would assist the surgeons continually in their manipulations; and what is more, save the occasion of much pain to patients; so

that, on the score of humanity, it is not creditable to practise the profession uninstructed in this well-known scientific attainment.

If surgeons felt fully the desire of throwing a scientific mantle over their profession, they would embrace with avidity every branch of science that could administer to its perfection. Sir John Herschel has thus expressed himself: — "Dynamics is placed at the head of all sciences, and, happily for human knowledge, it is one in which the highest certainty is attainable — a certainty in no way inferior to mathematical demonstration." This philosopher displays, with lively animation, the prospects which mechanics offer of conferring the character of science on chemistry. Surgery may be supposed to be, as a science, buried in the icy fetters of the Arctic pole; and no noontide beam has yet thrown its horizontal ray across this frozen region, to intimate that the night of days, or of weeks, may be at an end. We have brilliant examples of great scientific discoveries made by intellectual minds, when strenuously sustained in carrying on the work. The great astronomer Kepler laboured incessantly for nearly fourteen years before he finally perfected the demonstration of his celebrated theorem, which expounded the laws of gravity in their application to the planetary system, by which astronomy was made a perfect science; the splendid discoveries of Newton con-

firmed; and his own name celebrated in philosophy; thus showing that he had resources, by which he overcame all difficulties, and a penetration of mind that led him out of all perplexities.

In discussing the quality of the mind in reference to the progress of science, it is clear that the display of intellect is something very different from the mere acquisition of information. Every one must have noticed that he has often heard from the most uneducated countryman, wiser observations and juster conclusions, than from other persons, the best instructed. We may add to this observation the eagerness with which some well-informed medical men suggest mere trifles as discoveries of value, and the jealousy exhibited of claiming the authorship. "Illa credulitas ingens damnum scientiis intulit, ut, absque insigni aliquo augmento, exsangues jacerent." *

The turn for mathematics is so particularly an indication of intellectuality, that the study of this science must powerfully contribute to form and improve the highest qualities of the mind. And, as it has been expressed before, it is of all things best adapted to accustom the mind to exercise the habit of studying the relations of intellectual ideas. A celebrated mathematician, M. De Morgan, says, that mathematical inquiries are not more difficult to pursue, than the proceedings a porter would take to

* Bacon.

carry a parcel to some part of the town, with which he was unacquainted. Every body knows arithmetic, and the certainty that two and two make four, and probably, also, that if the radius is given, the whole circle is given. It cannot be asserted that any mind is totally deficient in comprehending the first steps of this science; and perseverance in application may reasonably be supposed to implant some degree of sufficiency.

The variations that occur in the application of the mind, either in regard to science, or generally to the purposes of life, arising from the innate distinction of the intellectual powers, must unquestionably attract a large share of consideration. As the mind is in truth the very principle of life, when applied to the actions of man, and to the relations which he has to all around him, so it is of great importance to determine every bias that may give it an impetus in a particular direction, by which a disturbing force is created in the calculation of its operations. It is therefore not at all irrelative to an inquiry that has science for its subject, to allude to those influences which prevail over the intellect, and give it an especial direction or power; by knowing which we may obtain a just estimate of its capability. The distinction between the perceptuous and the geometrical character of mind is, for the most part, fully striking in the powers each possesses. Thus we do not see, with

all the apparent ability that men of the perceptuous quality of mind exhibit, any indication of their possessing the quality of invention, that is, of discovering any thing to enlarge the field of cultivated science.

The difference observable in the mental capacities of mankind, does not always depend upon the simple distinctions of the natural endowment, for it also depends upon the artificial means by which they are gradually led to understand mankind itself. All the inducements, that the intercourse with the world hold out as motives for action, have a constant and prevailing influence to encourage the adoption of that character of mind which is best calculated to promote interests; that is, if not of sowing the seed, of encouraging the growth, of the perceptuous or the subtle turn of mind, and therefore of choking the very peering of the real intellectual plant. All the incitements to wealth, power, and position, are attractions to cultivate and strengthen the subtle character. And the medical profession, being one of competition especially, engages in its service the art best adapted for acquiring public opinion. And thus it is that subtlety is reputed to be talent. This bustling and fretful state does not allow of the quiet and unimposing demeanour which intellect delights in. All the desires and inclinations of the subtle mind are fostered by the imperfect construction of the scheme of actual life;

while the aspirations of the intellectual are smothered by the insatiable nature of cupidity. "Misericordia in eo et perfidia pari jure dilectæ. Nulla apud eum turpis ratio vincendi. Blandus pariter et invidiosus in alloquio; in seria et jocos artifex. Amicitias utilitate non fide colebat. Inter hæc eloquentia insignis; oratio acuminis et solertiæ plena, ut nec ornatui facilitas, nec facilitati inventionum deesset ornatus."*

Those who are fully satisfied that scientific surgery is making great advances, should produce the proofs necessary to substantiate the fact, and give the instances of the close connection of science with surgery. It appears to me that the most part of what is handed down to us, is rather a series of mere opinions, as they have been successively formed, with continual changes, than a code of scientific principles. We have, indeed, received the benefits of men of talent, in bringing new facts to light, but only with the results like those of the artist in his studio, or the manipulator in his museum — representations of things. We have no display of a master-intellect, that has elicited, by the discovery of relations, immutable truths, and combined them into an associated whole, so as to make a science of surgery. Hunter had a mind constituted for accomplishing this great work. He is admired but not followed.

* Justin.

I confess I have been much surprised to find that so many surgeons of a high repute in the profession, and whose faculties appear to have been exclusively devoted to surgery, and yet who have not, in their writings, even approached the way that leads to scientific surgery.

The great importance which is attached to operative surgery, does not in my mind confer any compliment to the scientific character of surgery. All men are, perhaps, desirous of possessing the ability of accomplishing some purpose that may draw to them admiration. Surgeons, whose qualities of mind hardly rise to that level in which intellect can direct them to real scientific studies, fix upon the display of operative surgery as a department in which they think to shine. In estimating the success of operations, we find that a large proportion are unsuccessful, although performed upon principles that are admissible ; but what is very startling, a vast number are continually performed which would be inadmissible, if science had enlightened surgeons, and enabled them to form correct judgments. Surgery, as a science, would decide many questions in the way of avoiding operations. The surgeon too eager for performing operations is not likely to impart scientific principles to his art.

In the collections of the periodical essays of the last century, where so many papers are found distinguished by the elegance of the diction, the cor-

rectness of the sentiments, and the soundness of the judgment, as to grace the age in which they appeared, there is one*, in which a proposition is made to discuss a question that would determine the degree of hindrance, the world had sustained for so long a time, in the progress of science, by the long-continued empire of the peripatetic philosophy. This would be, no doubt, an interesting investigation; but in carrying it on, the first element in the proposition should be settled—which is, the condition of the mind that seems so universally to prevail, by which men surrender their judgments to the opinions of others. Is it that they thus readily assent to that which is acquired without the labour and, perhaps, without the ability, of thinking? "Opinion ne peut rendre sage les fous; mais elle les rend contents." †

We are not to exclude from notice that power which language exerts over the minds of men. It has an empire which infringes upon the free exercise of the intellect. History has pointed out the fact that it has changed philosophy for sophistry. The striking and brilliant clothing of words, that oratory can put on, leaves the intellect in bondage; and the mind is satisfied with mere perceptions, which afford only a hollow conviction to the understanding. It is in science, as in every thing else, that a clear and happy mode of expression affords

* The Adventurer. † Pascal.

great advantage to the reader or hearer; but it lulls him into an affection for complying with what is proposed to his understanding, without any demand on the energies of thinking; and in this very way, it ensnares him into a readiness to give assent, before he has deliberated. "Diligentem veri cognitionem, atque acre studium philosophiæ, verborum splendor nonnihil impediat, quoniam præpropere mentem consopit."* Men of a merely perceptuous turn of mind set down as science, that which is only fact clearly and correctly displayed.

The improvement of surgery upon scientific principles, must commence and proceed by investigating the more common instances of disease, by which there is afforded a larger field for making observations, a wider latitude for determining the relations, and a greater facility for obtaining the points of bearing the facts have with each other, than the consideration of rare specimens of disease can afford. In this way only is the greatest knowledge of disease to be acquired. The simple and elementary principles are to be first understood in learning any science. Surgeons, by attaching so much importance to rare cases of disease, rarely do more for the benefit of surgery than giving currency to ill-formed opinions. "Ce n'est pas dans les choses extraordinaires et bizarres que se trouve l'excellence de quelque genre que ce soit." †

* Bacon. † Pascal.

Another impediment to the progress of scientific surgery is an impression existing in the minds of men, by fancying that the best road that philosophy can take, for discovering the nature of all things, is to be able to demonstrate the ultimate moleculæ of matter. There has always been inquiry going on after the philosopher's stone, in some way or other; and although the inquiries have had no other result than in bringing to light some isolated facts, yet the taste for such researches exists, and time and labour are employed in looking for the monads of Liebnitz. There is reason to suppose, that some persons soothe their minds with the happy expectation of being able to unravel all the complexities of the creation, by discoveries of this sort. "Abstrahere naturam homines non desinant, donec ad materiam potentialem et informem venturum fuerit; nec rursus secare naturam desinant, donec perventum fuerit ad atomam." *

The boasted excellence of intellect, like every other faculty, must be kept in health and vigour by exercise, in order to prove its superiority over brutes; for even instinct may display powers of intelligence in a degree above the lowest order of intellect. "Brutorum animalium instinctus plura inventa pepererint quam doctorum hominum sermones." †

It must be clear that that omnipotence which

* Bacon. † Ibid.

can be so prodigal in the exquisite endowments of the animal, for the purpose of its existence, must have afforded to man, into whom he has breathed the breath of life, principles of a much higher order than those required for mere animal life. If every sentiment of the heart, and every effort of the mind, are directed to the object of aggrandisement, how can the intellect soar into the regions of eternal truth? The mind that is not intellectual cannot be supposed to imbibe the pure sentiments and internal convictions of spiritual truths; and he that has read the most intellectual as well as most spiritual work that is extant—the Gospel of St. John, forgets that in treating religion with garish scoffings, he renounces the supposition that intellect is derived from the soul, and he makes a declaration that he places no value upon the highest condition of the mind. "Mirum non utique esse, curriculum non confici, cum homines ad minora deflectant. Metam autem non aliam esse, quam ut genus humanum novis operibus et potestatibus continuo dotetur."*

Science has been compared to a pyramid in structure, because it has a broad base; if so, it should be rather supposed to resemble an inverted one, for out of the first step of science, there springs an endless number of others. The vivifying principle that starts the first germ into existence endues it with an unceasing power of ex-

* Bacon.

pansion. It is the very quality of science that every step that is made in it must be inceptive of other advances. By the globus intellectualis of Bacon, we may conceive that he imputes to it the power of expanding in every direction. Science begins everywhere, and it ends nowhere. We know that the horizon of the mathematician has no boundaries. The omnipotent Author of the creation has declared that all the works of his hands are verity and judgment*; and this is a postulatum which must be accepted, before any scientific principles can be formed. When nature opens her lap of rich stores to the scrutiny of the philosopher, he finds that there is not a spot to which he can point his stile, in which a truth does not lie concealed, to bring which to light is a germ of science, which will not fail to go on to its full growth under the cultivation of an intellectual mind. All the parts of nature are made one whole by association. "Toutes choses étant causés et causantes, aidées et aidantes, médiatement et immédiatement, et toutes s'entretenant par un lien naturel et invisible, qui lie les plus éloignées et les plus différentes." † If all these relations were fully displayed, we should probably be surprised at the most unaccountable connection in which very different parts are held in correlation.

Man is placed in the midst of infinity. He is placed in infinite space—he exists in infinite time.

* Psalms. † Pascal.

He sees in the construction of diminutive creatures, parts that are infinitively small. He views in the sidereal system, a world of infinite greatness.* Why then should he be always receding to the centre, and contracting the compass of his observations? Why not take the wings of the morning and fly to the uttermost parts? Intellect has the quality of discovering truth; truth is wisdom; and "Wisdom was set up from everlasting, from the beginning, or ever the earth was." "Unto you, O men, she calls, and her voice is to the sons of man."†

I have endeavoured, in carrying on the preceding inquiry, to explain my notions of the quality of science, and of the possibility of applying it strictly to surgery; as I am convinced a Novum Organum is required in this department of knowledge. It must not be supposed that I have diverged from the immediate matter in dilating, to a limited degree, on the application of the mind not strictly included in the subject of surgery. The fact is, that as the qualities of the mind enter into all the affairs of life, it is difficult to define any limits; where circumstances may not bias the intellect in various directions, and shackle its powers.

The following observations have no pretensions for having a systematic character; being merely

* Pascal. † Proverbs.

the cursory notice of views formed in a long practice. The allusions to the cases that are noticed, are not intended to give a full description of them; but to bring the conditions of disease in such relations with each other, that principles of a scientific character may be established.